

**Day 3****L-1****PO-31***Abstract Number: 20318*

## **Problem Based Learning Model In Increasing Students' Ability to Design Interactive Teaching Media**

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This research is aimed at improving students' ability to design teaching media as one of important components that can ease the learning process. The improvement of students' ability to design teaching media is important to face the teaching challenge of education world in globalization era. Through Problem based learning they are demanded to move fast and responsive to the world development. Thus, the media used should be up to date. Through the implementation of Lesson Study following plan, do, see steps the Problem Based Learning wrapped in chapter design and lesson design which includes orienting to a problem, organizing learning process, assissting investigation, developing and presenting product, analyzing and evaluating problem solving process. The research method used is experimental method. Data collection technique used is test, questionnaire and observation. The hypothesis that says, the implementation of Problem Based learning can improve students' ability to design teaching media, is proven by the score process in the treatment which the average score is 70, and the average score of the next treatment improves to 85 which belongs to very good level. It can be concluded that Problem Based Learning model by implementing Lesson Study succeeded to improve students' ability to design teaching media.

Key words: Problem Based Learning model, teaching media

**Day 3****L-2****PO-32**Abstract Number: **20373**

## **First Grade Students' Concepts of Subtraction in Classroom using Lesson Study and Open Approach**

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The purpose of this research was to analyze subtraction concept of students through mathematical representations in classrooms where use Lesson Study and Open Approach. Data were collected from 24 students in the first grade of elementary school in Chaiyaphum province, which one of the schools in the Students' Mathematical Higher Thinking Development Project in Northeastern of Thailand. Moreover this classroom is using continuous Lesson Study and Open Approach based on the Inprasitha's concept (2011). The data were: 1) protocol data transcribe from voice recorder and video recorders during instruction of the class 2) students' writings, and 3) protocols from interviews of students. The research based on Vergnaud's Conceptual framework (1996).

The results of this research showed that the concept of students are three tuple of three sets 1) Set of Situations that meaningful for students : Pictures which have action of objects or people in the pictures along with the language of the action, situations was posted by teacher 2) Set of operational invariant to deal with these situations: removing block that represent number in situations and 3) Set of symbolic representations: line and arrow are represented action of subtraction, the natural language word and sentence for explain action (Remove, Take out, Scoop out and Eaten). These representations used to represent the relationships involved, communicate about them.

**Day 3****L-3****PO-33**Abstract Number: **20065****Effects of Critical Thinking Through Group Learning in Japanese Undergraduate Nursing Students**Yukari Sato, *Aichi Medical University*Etsuko Masunaga, *Ichinomiya kenshin University*Chie Yamada, *Fujita Health University Hospital*Tsunehiko Ban, *Sugiyama Jogakuen University*

Previous studies have demonstrated the need for Japanese university students to employ logical thinking skills, including critical thinking (CT) skills. Nursing colleges have also indicated the need to improve these skills, and group learning (GL) is reported to be effective. This study aims to clarify existing knowledge about the effects of CT in nursing education by focusing on GL. A literature review was used. Using CT, 'Nursing,' and Student as search terms, the selection criteria were as follows: (1) undergraduate nursing students in Japan, (2) group learning, and (3) critical thinking findings (4) include the original work thesis. Selection method was searched in Japan Medical Abstracts Society WebVer.5 and Current Index to Japanese Nursing Literature web version, CiNii. A total of 77 results were obtained. Literature consistent with the study's purpose was read carefully and 10 papers were ultimately selected. In terms of research design, five were quantitative studies, three were qualitative studies, and two studies used both quantitative and qualitative research. The learning methods used in the selected papers were exercises, practical training, and extracurricular activities. Among the quantitative studies, four scales were used to measure the effects of CT and three learning methods were used. The common scale used in the literature was the 'CT Skills Self-Assessment Questionnaire' and two learning methods (exercises, practical training) were used among those studies. In the present study, we integrated findings from three papers that used the 'CT Skills Self-Assessment Questionnaire.' Results showed that 13 items were commonly improved. Three items improved with exercises, five with practical training, but there was no improvement in four of the items. The meta-integration results for qualitative studies consisted of two categories, eight subcategories, and 34 data items. The category 'Learning methods leading to effective self-reflection' comprised three subcategories: 'Theoretical utilization making sense of self-reflection,' 'The need to analyze selfreflections,' and 'GL methods leading to self-reflection.' The category 'Learning effects obtained through self-reflection' comprised five subcategories: 'Acquiring a critical thinking attitude,' 'Recognizing relationships with others,' 'Clarifying what is to be improved about oneself,' 'Noticing one's tendencies (weaknesses),' and 'Noticing one's tendencies (strengths).' Based on the result of integrating quantitative research, CT skills acquired depend on the learning method used. In exercises, students acquire skills to understand the meaning of other students' remarks and to express personal opinions and exert group roles. In practical training, students acquire communication skills in a broad sense; these included interpersonal skills and skills to understand and predict patients' conditions and provide nursing care. The meta-integration results of qualitative studies revealed 'Learning methods leading to effective selfreflection' and 'Learning effects acquired through self-reflection.' In the qualitative research examined in this study, a GL method was used for practical training and exercises and

descriptive content from reflective journals (RJ) was used as data and analyzed. The importance of intentionally performing self-reflection has been noted for the development of practical nursing skills. In the present study, learning methods including CT acquisition were revealed and the usefulness of RJ as an assessment method for effects in GL was confirmed. Moreover, the need to use theory to analyze self-reflective content became clear as a 'Learning method leading to useful self-reflection.' It is suggested that the attitude learners have toward participation leads.

**Day 3****L-4****PO-34****Abstract Number: 20254**

## Using Variation Theory as an Approach to Teach Organic Chemistry Nomenclature

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The structure-property relationship is an important fundamental concept to understand other chemistry concepts. The basis of the understanding of the concept is knowing the Lewis structure of compounds. For organic chemistry, a good understanding of the nomenclature is required to draw a correct Lewis structure. However, a general performance on naming and drawing structural formulae of organic compounds for high school students is low (Adu-Gyamfi, Ampiah, & Appiah, 2013). Some of the difficulties in writing the name of an organic compound from its structure are the inability to: (1) identify the correct parent chain; (2) assign the number to the carbon in the parent chain; (3) name all the substituent groups correctly. Given the abovementioned students' difficulties, it is imperative for teachers to design pedagogical strategies targeted at tackling this issue.

A learning study framed with variation theory is designed and the object of learning selected is for students to identify the parent chain from the Lewis structure of an organic compound. The theoretical framework allows teachers to develop new ways of examining the object of learning. In variation theory, teachers are guided to focus on analyzing the critical aspects of the object of learning. The presentation entails the author's conceptualisation of her research study that involve pre-service Chemistry teachers learning to apply variation theory in planning a lesson on organic chemistry nomenclature and to explore whether the teachers' participation in a learning study improves teachers' content knowledge and pedagogical content knowledge and address the following questions which are pertinent to the research study: (1) What are some of the critical aspects pre-service teachers might need to determine in order to identify a parent chain? (2) What are some possible patterns of variation pre-service teachers could effectively employ to teach the select topic?

A literature review relevant to addressing the abovementioned questions will be presented. Studies have reported on how students often fail to notice the concept of a parent chain which is the longest continuous chain of only carbon (Adu-Gyamfi, Ampiah, & Appiah, 2012; Obummenye & Ahiakwo, 2013). Based on extant literature, the critical aspects identified as the element constituting the chain, the length of the chain, and the continuity of the carbon bonding in the chain (these aspects will be further ascertained through the author's research study). Four patterns of variation and invariance were designed and will be provided to the pre-service teachers as examples of how they might assist their students' discernment of the critical aspects; these will also be discussed in the presentation. What is interesting and novel about the patterns of variation is that the sequence of enacting the patterns is deemed crucial to learning, where the patterns of variation of critical aspects are contingent on simultaneous discernment of earlier critical aspects and where a careful instrumentation of variation could promote students' discernment of the relationships between each critical aspect.

The presentation, focusing on the author's own conceptualization of how variation theory could be

used to promote pre-service teachers' teaching of organic chemistry, further extends current understandings of the application of variation theory to teaching difficult schools topics. Concomitantly, it could benefit science educators who struggle with teaching the select topic. Although other approaches are available to guide students in learning nomenclature of both inorganic (Morris, 2011; Wirtz, Kaufmann, & Hawley, 2006; Wulfsberg, Sanger, Melton, & Chimeno, 2006) and organic compounds with the aid of visual models (Palacios, 2006; Sarkodie & Adu-Gyamfi, 2015), the theoretical paper proposes a pedagogical approach that is arguably more student-centred and theory-framed. How the proposed approach could be used to complement existing visual models will also be discussed.

**Day 3****L-5****PO-35***Abstract Number: 20135*

## **The Implementation Combination Stad and Mind Mapping Based On Lesson Study to Improve Motivation and Concept Mastery of Seventh Graders**

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Student Teams' Achievement Division (STAD) has put its emphasis on reward as a manifestation of reinforcement for what students have done/performed in class. The so-called reward aims at boosting students' motivation. Mind Mapping constitutes a method to holistically process information. In further details, Mind Mapping enables students to store information, organize information, make priority, learn to comprehend any information by its contexts, review certain materials, as well as memorize complete information. Accordingly, when coming to comprehending particular concept, the combination between STAD model and Mind Mapping is worth implementing for further investigation.

This current study aimed at: (1) improving the students' learning motivation particularly on Conservation material; and (2) facilitating the students to comprehend the concept of Conservation. Lesson Study-based Classroom Action Research was employed in this study. There were two cycles. This study was conducted in MTS Muhammadiyah 1 Malang, to be specific for the seventh graders (Class II of Natural Science stream) in the Odd semester, Academic Year of 2017.

It has been revealed that: (1) The combination between STAD and Mind Mapping has been well implemented during the Plan, Do, and See stages of Lesson Study. There has been improvement shown in every instructional session. (2) The implementation of the combination between STAD and Mind Mapping has improved the students' motivation and concept mastery. Further implications include designing clearer instruction and better time management.

**Day 3****L-6****PO-36**Abstract Number: **20403**

## **Teachers' Mathematical Structures A Case Study of Lesson Plan Team in Classroom using Lesson Study and Open Approach**

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According to Shimizu (2017) state that Teachers' Knowing Mathematical Structures is important for teaching and learning Mathematics, in particularly designing lesson plans and predicting the ideas of students. Lesson Study as innovation to let many teachers work together like a team that called 'Lesson Study Team' for designing, observing and, discussing and reflecting lesson plans for developing their Mathematical knowledge and sharing their ideas together (Inprasitha, 2011).

The objective of this study to explore mathematical Structure of a Lesson Plan Team, a group of teacher who volunteer for participate in a team after they attended a workshop on how to use Mathematical textbook that translated from Japanese language to English, and using Lesson Study and Open Approach as the innovation in school by Faculty of Education, KhonKean University (Inprasitha,2017) This study is a the qualitative case study that emphasized on protocol analysis and analytical description.

Collecting the data from two learning units: Positive and Negative number and Algebraic Expressions in Grade 7th mathematics Contents , by using video recorder, audio tape recorder, images recorder and field note, and analyzed by using lesson study ' protocol in the first step of lesson Study which is 'Collaborative design a research lesson' or Plan step (Inprasitha,2011).

A researcher collected the data by using video recorder, audio tape recorder, images recorder and field note in the first step of Lesson Study which is 'Collaborative design a research lesson' or Plan step of Lesson Study (Plan , Do ,See) (Inprasitha,2011). By focusing Lesson Study team's discussion about mathematical knowledge to design lesson plans on first two units of Grade 7th mathematics Contents which are Positive and Negative number and Algebraic Expressions.

The results of this study showed that mathematical Structures like mathematical knowledge in form of key words, which is lesson Study team help together to design lesson plan. For example in the last lesson Plan of Positive and Negative number, which is in the topic of Mixed calculations. Before designing this Lesson Plan, students have to know addition, subtraction, multiplication and division first, and then they can do it step by step like Algorithm. So, Lesson Study team have to know about Mathematical Structures to be algorithm of learning. Lesson Study gave a chance to teachers in Lesson Study team to share their knowledge and adding perspective to look at mathematical knowledge like a structure, that is mathematical Structures which help designing lesson plan better.



**Day 3****L-7****PO-37****Abstract Number: 20205**

## **The Workbook of Technological Knowledge for Strengthening Natural Science Teacher Competencies**

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Technological Pedagogical and Content Knowledge (TPACK) is a conceptual framework that shows the relationship between three kinds of knowledge. Needed by the teacher or prospective teacher including technological knowledge, pedagogical knowledge, and content knowledge. The objective of this study was to develop a workbook of Technological Knowledge (TK) for Strengthening Natural Science Teacher Competencies. The workbook was developed from essential indicator of Teacher Competency Test. Design, develop, simulation and validation of workbook by internal validator conducted at the Laboratory of Biology Education FKIP University of Riau. External validation by experts, pilot test and user response of the workbook in Pekanbaru Natural Science Teacher Forum. Workbooks validated on four aspects of the Technological Knowledge include format, content, illustrations and language. Validated workbook will be disseminate after revised. The workbook can be used as a learning resource by the teachers to improve technology competencies and teaching and learning process.

Keywords: Natural Science Teacher, Technological Knowledge, workbook

**Day 3****L-8****PO-38****Abstract Number: 20406**

## **An Exploration of Approach for Collaboratively Plans with Lesson Study Team in Student Interns Practicum**

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Initial teacher preparation program has closely link and has a great impact for quality of teacher (Inprasitha, 2013; Sowder, 2007) Inprasitha (2010) proposed the framework for teacher education program of Mathematics Education, Khon Kaen University which immediately linked between pre-service and in-service teacher program by Lesson Study (Inprasitha, 2015). In last year of Mathematics Education program, student interns teaching practices with lesson study incorporating open approach at schools project of the students' mathematical higher thinking development project in northeastern of Thailand, consist of lesson study team in weekly cycle (Changsri, 2012, Thinwiangthong, 2012).

The context of study was student interns' practicum at Ubonratchathani province based on project school. There were 6 schools and 6 lesson study teams. The purpose of this study was to explore the differences in approach for collaboratively plan with lesson study teams. Target groups were 13 student-interns from Mathematics Education program, Khon Kaen University. The data collected by participant observation, group and individual interviewing. Data were collected 3 months and analyzed by content analysis and grouping the practice for improving lesson plans through the umbrella of Lesson Study based on Inprasitha (2010).

The results of the study were as follows: there were several approaches for collaboratively plan. Participants for collaboratively plan the lesson can be classified into 3 sessions. 1) Student intern collaboratively plan with mentor teacher, 2) Student intern collaboratively plan with student interns as peers same school, 3) Student intern collaboratively plan with student interns from other schools and 4) They joined to plan the lesson at the faculty with peers and lecturers as adviser. They collaborative analysis mathematics textbook in order to identify aim of lesson and anticipate students' ideas and students' difficulty. They compared students' ideas crossed school with peer through social media such as Facebook and Skype. The mentor teachers provide information about how students' response to problem situation.

**Day 3****L-9****PO-39**Abstract Number: **20364**

## Comparison of Specific Content Knowledge of Students in Physical Education Teacher Education Program

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### 1. Background/Purpose

Rink (2014) and Ward (2013) stated that content development is a critical skill for physical educators. Further Ward et al (2017) extended the conceptual understanding of content development by integrating pedagogical content knowledge (PCK), and they argued that content knowledge is related to PCK. Content knowledge can be categorized into common content knowledge (CCK) focused on rules, etiquette, technique and tactics; specialized content knowledge (SCK) concerned with an understanding of the students' errors in performance. Although Ward, Lehwald, Lee (2015) introduced an assessment tool for measuring SCK of teachers using content map validity of content map to measure content knowledge has not been examined extensively. Thus, the purpose of this was to determine the extent to which the content map and the can discriminate between different levels of SCK. More specifically this study investigated the content development in three groups differentiated by content expertise, advanced experience and experience. Research questions were: (1) Is SCK differentiated by groups? (2) How does SCK appear in different formulae of content development variables?

### 2. Method

A total of 53 (M=42, F=11) students participated in this study. The participants were classified into three groups: The first group consisted of Elite soccer players (N=18). The second group consisted of PE majors who were considered competent and are playing at intramural soccer league (N=18). The third group consisted of students who have taken soccer class (N=17). Participants were asked to complete a content map (i.e., list the skills and tactics from the initial tack to more complex tasks horizontally, list and sequence of the instructional tasks vertically, use arrows to show progression of the tasks, etc.) of soccer. The content map measure 7 variables (i.e., Informing task(I), Extension task(E), Extension-applying task(EA), Refining task(R), Refining-applying task(RA), Applying nongame task(AN), & Applying task-game(AG).

### 3. Analysis/Results

Descriptive statistic and One-Way ANOVA analysis was used to analyze the differences among group's means of content development variables. Results of the study showed that elite and intramural soccer players scored higher than class takers in terms of E, EA, R and RA. However, there were no significant differences between elite and intramural players group in the scores of the E, EA, R and RA. The second group showed highest scores in EA and RA.

#### 4. Conclusions

This study showed that content map discriminated the SCK of expert groups (e.g., elite and intramural soccer players) from the less experience group of students (e.g., soccer class takers) in PETE program. The expert groups demonstrated more organized content map and thus scored higher in extension and refining categories in content development. Measuring SCK and concurrent validity was discussed in relation to content map scores and instructional tasks.

**Day 3****L-10****PO-40***Abstract Number: 20243*

## **The Use of Lesson Study in Teacher Mentoring Activities at Teacher Working Group in Aceh Jaya District, Aceh, Indonesia**

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This article, 'The Use of Lesson Study in Teacher Mentoring Activities at Teacher Working Group in Aceh Jaya District, Aceh, Indonesia' focused on how to use lesson study in mentoring the teachers through activities in teacher working group (KKG), a structural professional organization established by teachers in a region or cluster of schools as a medium for exchanging experiences to improve teachers' ability and improve learning quality. This program implemented at Aceh Jaya District, Aceh, 1-6 September 2016. The participants in this mentoring activity were the primary school teachers in Aceh Jaya District. Number of participants was 47 primary teachers, 10 district facilitators of Aceh Jaya District and 1 collaborator from LPTK lecturers.

The use of lesson study in teachers mentoring activities of at the Aceh Jaya District KKG had a positive impact on improving the personal competence of primary teachers in Aceh Jaya District. The pattern of implementing mentoring with a lesson study approach that is divided into planning, implementation and reflection stages has helped teachers not only in understanding the characteristic of knowledge, skill and character to be taught to students, but also assisting them in designing more systematic learning steps, preparing student workbooks with focus On the competencies to be trained, preparing simple learning media that students can easily understand, and helping them design more authentic evaluation tools.

What still needs to be strengthened in the future is the emphasis on the use of learning methods that are more challenging students to work more leverage in groups both inside and outside off the classroom. The use of cooperative learning models, worksheets and more creative learning resources will help teachers realize that.

**Key Word:** lesson study, teachers mentoring activities, Aceh Jaya District, Aceh, Indonesia

**Day 3****L-11****PO-41**Abstract Number: **20127**

## **Lesson Study-Learning Community for Prospective Biology Teachers in Coordination System Material**

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Exposing prospective teachers with various experiences in conducting instructional activities based on Lesson Study is expected to equip them with necessary professional, pedagogic, social, personality, innovative, critical thinking, collaborative, and communicative competences. This current study aimed at describing the implementation of Lesson Study-Learning Community for prospective Biology teachers attending Biology Instructional Management Program course, particularly for teaching Coordination System material. This current study was conducted by employing descriptive design. The subjects were sixth semester students of Biology Education department of University of Muhammadiyah Malang, in total of 25 students, divided into 5 groups. Every student in a group, in turn, became a model teacher, student, and observer. They implemented Lesson Study-Learning Community by following Plan, Do, and See stages.

During Plan stage, the prospective Biology teachers, in groups, made chapter design and lesson design outside the class hours. During Do stage, they were conducting instructional activities and the observers observed the 50-minute instructional session. During See stage, there was a reflection between the model teacher and observers. The data were analyzed descriptively and qualitatively. It has been shown that 80% students were satisfied with their role of being model teachers, observers, and students in Lesson Study.

The model teachers implemented collaborative strategy when making chapter design and lesson design, particularly for teaching Coordination System material, with their peers in groups. The model teachers implemented problem-solving method upon their teaching practice. The observers observed any activities occurring in the class. The model teacher and observers reflected on their class session. Lesson Study ' Learning Community in Biology Instructional Management Program course has equipped the students as the prospective Biology teachers with necessary teaching experiences before conducting teaching internship in schools.

Key words: Lesson study-learning community, prospective Biology teacher, coordination system

**Day 3****L-12****PO-42****Abstract Number: 20128**

## **Assistance Program for Prospective Teachers by Implementing Lesson Study in Biology Instruction on Natural Colorings**

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This current study aimed at describing the competence of prospective Biology teachers in designing Biology instructional activities by utilizing the results of research on natural colorings in soybean extract drink. This current study was conducted by means of Lesson Study. The chosen material was digestion and additive substance for food/drink. The results of research to incorporate upon teaching were the combination of dragon fruit peel/skin and teak wood leaves as the natural colorings, rich of antioxidant, added to soybean extract drink.

Qualitative designed was employed in this current study. Students of Biology Department, Faculty of Teacher Training and Education, University of Muhammadiyah Malang who were in their sixth semester and attending Microteaching course were recruited as the subjects of this study. Assistance program was covering the following materials (1) designing instructional activities, (2) teaching, and (3) reflection. The qualitative data were in the forms of the results of instructional design/planning, implementation, evaluation, and reflection by the students. The data were analyzed descriptively.

This current study has resulted in the followings (1) the prospective Biology teachers were capable of designing the instructional activities shown by their making chapter design and lesson design, (2) they could implement and evaluate their teaching of natural colorings in soybean extract drink, and (3) they could reflect their instructional activities through Plan, Do, and See stages of Lesson Study.

It has been concluded that the competence of prospective Biology teachers in designing Biology instructional activities has been improved through the implementation of Lesson Study in Assistance Program by utilizing the results of relevant research.

Key words: assistance program, Lesson study, research-based instruction

**Day 3****L-13****PO-43**Abstract Number: **20164**

## **Development of Teacher Training Method by Immediate Sharing of Teachers' Recorded View in Practical Lessons**

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The purpose of this study is to determine the effectiveness of a teacher training method using information from teacher's view captured by wearable camera. The method is originated especially to help pre-service and novice teachers without long experience design practical lessons quite similar to workshops and create materials used in these classes. This paper makes the interim report of the study.

In teaching practices or teacher training programs of Japan, teachers are usually observed by other teachers (observers) or recorded by handy-camera from the back of the classroom, which makes it difficult for observers to know in detail what instructions teachers give to their students while walking around the classroom.

We came up with a hypothesis that the process where teachers see students reacting and responding, then accordingly change teaching styles or go for more suitable techniques to achieve the goals fixed in their lesson plan can be analyzed by tracing their recorded view along with their remarks.

To test this, a wearable camera worn by a teacher was connected with a tablet PC of an observer via Wi-Fi, and thus the observer came not only to grasp the atmosphere of the entire classroom but to monitor how the teacher went forward.

In this test, the observer obtained the materials and lesson plan from the class teacher beforehand to modify them while monitoring the class.

As a result of monitoring a veteran teacher with 25 years of teaching experience in technical arts, the observer could also identify the student's various learning problems and straighten out the matter at the same time when the in-service teacher judge it necessary.

It can be said that this method is effective for observing teachers to think about re-designing the lessons or modifying the materials in real time when in-service teachers are dealing with the situation.

Furthermore, feedbacks from observing teachers could also be helpful for further improvement of lessons designed by veteran teachers.

The possibility of the observation by more than one observer at the same time will be considered after this test.



**Day 3****L-14****PO-44***Abstract Number: 20130*

## **The Implementation of Lesson Study on Animalia Material for Prospective Biology Teachers**

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The common problem encountered among prospective teachers is their lack of readiness to seek and dig out information regarding instructional materials. This current study aimed at describing the implementation of Lesson Study for prospective Biology teachers, particularly on preparing for teaching Animalia materials. Qualitative design was employed in this current study. Sixth semester students of Biology Education department were recruited as the subjects. There were in total 25 students (prospective Biology teachers) divided into 5 groups. Every student in a group, in turn, became an observer, student, and model teacher. They implemented Lesson Study by following Plan, Do, and See stages. During Plan stage, the model teacher designed a Lesson Plan. During Do stage, the model teacher conducted instructional activities based on the designed Lesson Plan. During See stage, there was a reflection to examine and analyze the instructional activities so as to find out the weaknesses to improve further. This current study has revealed that more than 90% of prospective Biology teachers have shown the followings: (1) their improved competence to design instructional activities, particularly in making Chapter design and Lesson design; (2) their ability to conduct instructional activities, specifically on Animalia materials; and (3) their ability to do a reflection on their instructional activities. It is concluded that Lesson Study has equipped the students as the prospective Biology teachers with the competence to design and conduct their instructional activities in class.

**Key words:** Lesson Study, Animalia, Prospective Biology Teachers

**Day 3****L-15****PO-45**Abstract Number: **20408**

## **An Exploring Teachers' Mathematical Knowledge for Teaching Fractions**

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Teachers' mathematical knowledge for teaching is important to improve teaching and learning mathematics (Ball et al., 2008). Particularly, teachers' knowledge of fractions is important because fractions are notoriously difficult to learn and teach (Newton, 2008). Iwasaki et al. (2005) founded Thai teacher believed that teaching fractions was easy and student learned fractions easily. Student just followed the teacher and practiced with exercises, but student achievement was very low. Khon Kaen University, Center for Research in Mathematics Education has implemented Lesson Study and the Open Approach in schools aimed to developing Thai mathematics teaching profession based on Lesson Study (Inprasitha, 2015).

This study aimed to explore teachers' mathematical knowledge for teaching fraction. Data collected from 175 mathematics teachers from project schools. These project schools participated in long term professional Development by using Lesson Study and Open Approach based on Inprasitha (2011). This study was the first phase of project. A translated and adapted version of mathematical knowledge for teaching about fractions test was used to gather data on teachers' mathematical knowledge for teaching about fractions. There were 14 items include 6 multiple choices and 8 comprehension tests. Data were analyzed by using basic statistics.

The study result revealed as follows: 1) 46.14 percent of teachers justify Pedagogical Content Knowledge (PCK) in anticipation of students' idea both of correct and misconceptions ideas about the meaning of fractions and comparing fractions, selecting examples to take students deeper into mathematical content or selecting appropriate representations to illustrate the content about ordering fractions, comparing fractions and relationship between fractions and decimals, teachers understand about the sequence of teaching in each content, teachers know a topic being taught to topics from prior or in the future about operations of fraction. 2) 41.84 percent of teachers justify Mathematical Subject Matter Knowledge (SMK) on solving and calculate an answer correctly, using mathematical signs and symbols correctly, definition or specific mathematical explanations about the fractions system and operations of fraction.

Keyword(s): Mathematical Knowledge for Teaching, Lesson Study and Open Approach

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**Day 3**

**L-16**

**PO-46**

Abstract Number: **20311**

## **How Preservice Teachers Use Assessment Questions In Mathematics Classroom Using Lesson Study and Open Approach**

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Jensamut Saengpun, *Chiang Mai University*

Pisittha Kachi, *Chiang Mai University*

Classroom assessment is a systematic collection of information about students' abilities, characteristics, skills, understanding and knowledge developed, administered and scored by a teacher for the purpose of evaluation (Frey, 2014). Assessment can be done before, during and after instruction. Information gathered during assessment can be used by teachers to improve instruction or to summarize students' achievement and monitor their learning (Cornelia, 2015). The purpose of this study was to analyze using assessment questions of pre-service teachers who taught in teaching practicum program in schools using lesson study and open approach. Target group was lesson study team in grade 1 at Chumchon Banbuakkrognoi school. Lesson study team composed of the pre-service teachers, teachers and observers. A research instruments were lesson plans, research note, observation note, video recorder and students' works. Data were analyzed by content analysis. The result showed that assessment questions are used to assess students' mathematical thinking in mathematics classroom through 4 steps in open approach: Posing Open ended Problem step ; pre-service teachers used assessment questions for assess understanding students' problem situations. Student' self learning step; pre-service teachers used assessment questions for observing how students solve the problems by using worksheets. They realized the important topic from assessment questions and used Assessment eye for assess students' mathematical thinking followed assessment questions in each lesson plan. Whole class discussion and comparison step; pre-service teachers used assessment questions for create questions In which type of questions focus on students' reasoning. So the often words were why? how? because? This case, questions will be used with Just-in-time Assessment. Pre-service teachers assessed students' mathematical thinking by students' presentation of ideas, question posing and answering the questions. Summarization through connecting students' mathematical ideas emerged in the classroom step; pre-service teachers used assessment questions for students' summarize how to solve the problem or students' analysis and decision on the best solution. The questions for summarization are created and defined in lesson plan that questions will be used with Just-in-time Assessment. Pre-service teachers assess by using students' answer for adjusting the teaching in next classes continuously.

Keyword(s): Classroom assessment, Assessment questions , Lesson Study, Open Approach

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**Day 3****L-17****PO-47***Abstract Number: 20160*

## **The Character Development of Professional Teacher Candidate through Lesson Study Based Learning Study**

Poncojari Wahyono, *Muhammadiyah University of Malang*

The development of character values within the national education system is a strategic step to foster a noble value in learners. One of the keys to success of these efforts is teachers interaction of learning with students. Teachers who are able to demonstrate professional values have an important role in order to foster positive characters in students such as honesty, creativity, communicative, and self-evaluation. The implementation of this lesson study involves sixth semester students taking advanced genetics courses. The plan, do and see stages are implemented by involving all groups in each class. Implementation of learning using lesson study as a learning community able to develop the character's values to the students by 11.69% for creativity, communicative of 11.33%, honesty of 4.55%, and self-evaluation of 8.71%.

**Day 3****L-18****PO-48***Abstract Number: 20382*

## **Model of Lesson Study and Open Approach in Healthy School**

Suttharat Boonlerts, *Suratthani Rajabhat University*

This study was aimed to describe model of lesson study and open approach in healthy school of Thailand. Research participants consisted of teachers and director from one primary school, four persons in total, two student teachers majoring in mathematics, and three professionals. Data were collected by field recording and interview. After that, data were analyzed as content analysis and validated by researcher triangulation.

The results found that;

School represented some integrations of healthy school concept by using contemplative education, which constituted of community establishment and community's lifestyle, using positive psychology, conducting activity through contemplative education, together with open approach in mathematics instruction as core subject and utilizing lesson study in the stages of research lesson design and of collaboration to observe research lesson. While the stage of collaboration to discuss and reflect lesson outcomes, it was used with PLC (Professional Learning Community) of school.

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**Day 3****L-19****PO-49**Abstract Number: **20380**

## **The Reconciliation between Critical Pedagogy and the Intellectual Freedom: A Case Study of Cowhey's Classroom**

Kazuki Uematsu, *The University of Tokyo*

The purpose of this study is to consider Jacob W. Neumann's ideas on reconciliation between critical pedagogy, the theory and practice toward changing the social reality, and students' intellectual freedom within the context of teacher's curriculum development. We explore this question using the case study of Mary Cowhey's practice in classrooms.

Critical pedagogy is a series of educational studies that, along with neo-Marxism, has mainly been advanced in the United States. Its focus is on power relationships and inequality concerning formal education. Two scholars, Michael W. Apple and Henry A. Giroux, lead Critical pedagogy in U.S. While Apple has analyzed the reality of schooling within the political, economic, and social contexts, Giroux has developed his own pedagogy, called "border pedagogy," to describe the cultural politics of resistance toward democratic society. Giroux's border pedagogy is greatly influenced by Paulo Freire, a Brazilian educator. Freire is famous for the idea of "banking education" and has argued that education is political and cannot be neutral. Giroux (2005) has also admitted the influence of the Freire's practice and theory on his work.

Despite Apple and Giroux's influence, Neumann (2009) has pointed out that, while critical pedagogy's proponents consistently utilize the language of freedom, democracy, and emancipation, too often the methods of enacting critical pedagogy found in the literature eschew democratic, student-centered engagement for a form of prescribed analysis of issues of the teacher's choosing. He also notes "the rhetoric of freedom followed by a too frequent practice of scripted control" (p. 125). If all education is political and cannot be neutral, he argues, then it is necessary to reconcile between critical pedagogy and students' intellectual freedom in classrooms, so that students learn to think and act democratically by thinking and acting democratically.

Neumann (2013) refers to some classroom practices as the alternative approaches to critical pedagogy. They are practical, take into account teachers' knowledge and beliefs, and fit into teachers' already crowded work lives. One of these is Cowhey (2006)'s classroom practice. She, too, was greatly influenced by Freire, but her practice was different from the typical ones of critical pedagogy. This study explores the above question of reconciliation by analyzing Cowhey's classroom practice. As a result, it shows how her practice included Freire's key concepts, dialogue and generative themes, and that there are multiple goals for students rooted in their own experiences and interests.

**Day 3****L-20****PO-50***Abstract Number: 20197*

## **Development of STEAM Curriculum based on Rural Culture -- A Case Study of Chinese Schools**

*Junjie Zhang, Zhejiang University*

STEAM curriculum is a sort of comprehensive curriculum integrating science, technology, engineering, arts and mathematics. The emergence of STEAM curriculum is one of the latest achievements of curriculum development and reform all over the world, since it emphasizes the application and innovation of science and technology, and highlights the cultivation of both pioneering spirit and practical ability. Scholars have researched and discussed on STEAM curriculum theories, such as its concept, development, organization, activity design, assessment, and so on. In the meanwhile, lots of countries have carried out STEAM curriculum practice, they have developed project-based STEAM curriculum like 3D printing and Scratch programming while there were also cases that add contents of arts curriculum to technology and engineering disciplines. In China, STEAM curriculum has also got more and more attention in K-12 education and schools in developed areas have built innovation workshops to encourage students to participate in STEAM curriculum in their club time. Ministry of Education of the People's Republic of China enacted <Science Curriculum Standards of Primary School Education> in 2017 which stipulated that science classes should be offered in the first grade. That also promoted the innovation in science curriculum, therefore more and more teachers and education researchers put their eyes in STEAM curriculum.

But now, in the practice of STEAM curriculum in China, there are problems such as the lack of curriculum teaching resources, the lack of discipline integration, the lack of laboratory construction standards and implementation plan, the lack of professional teachers and so on. Schools in rural areas in China which can't afford advanced educational facilities face big challenges particularly

Considering the significance and complexity of the research on the practice of STEAM curriculum, this poster elaborates the representative cases of some schools in rural areas in China about how to develop STEAM curriculum based on traditional local culture. Rural culture in China includes farming culture, folk customs, traditional techniques, and so on. All of them provide rich resources for STEAM curriculum design and development. In 2016, I joined in a volunteer teaching program which aimed to improve the teaching of rural schools. I advised local teachers to introduce STEAM concept into science courses and we decided to develop STEAM curriculum according to local conditions. We inspired students to mash various vegetables for the paints and make use of them to create paintings. According to this project, students were able to understand how to extract natural pigments in ancient. What's more, students built close connection between arts and science. Another case is about production of diabolos (which called 'kongzhu' in Chinese) in primary schools. It integrated three disciplines including arts, technology and physical education to help children make their own toys. In the process of our exploration, students are expected to master the properties of various materials and realize scientific principles about playing diabolo. Questionnaire survey, focus group interview and participant observation are employed to research feedback from students and local teachers. Overall, students took a positive view of the course.



In spite of financial difficulties, schools in rural areas in China still try their best to bridge the gap between local culture and STEAM curriculum. And this kind of curriculum development pattern involves with students, teachers, folk craftsmen, farmers, educational researchers and so on. In the end, this paper put forward the possibility of further research on the practice of STEAM curriculum based on rural culture. Also, it should be further considered in curriculum integration, resource development and teacher training.

**Day 3****L-21****PO-51**Abstract Number: **20316****Developing Health-Education Curricula Based on the 1970s-1980s Practice Records of Yogo-Teacher Sakaguchi Setsuko**Rie Arima, *The University of Tokyo*

Concern over the educational role of the Yogo-Teacher has been growing in the field of school health services for the last several years. However, it has not been reported the educational characteristics and practices of Yogo-Teacher. The purpose of this study is to clarify the process of developing health-education curricula based on the practice records of a famous Yogo-Teacher, Sakaguchi Setsuko (1930' 015), who influenced many other Yogo-Teachers. She recorded children's mental and physical difficulties, used these records to identify the problems in their educational environment, and then created original curricula to address those problems.

First, the study briefly discusses Yogo-Teachers most of whom are female and work full-time in Japanese schools, usually one or two to each school. They are often compared to school nurses in other countries, but Yogo-Teachers are teachers. According to a historical study by Sugiura (1985), Yogo-Teachers date from the Meiji era, in which they were like school nurses, combatting contagious diseases. In 1941, during World War II, the Japan National School Order established the position of Yogo-Kundo (teacher), and most school nurses became Yogo-Kundo at that time. Although in 1947 their role was renamed to Yogo-Teacher, their main work was still to address urgent nursing and public-health problems, including controlling contagious diseases. However, improvements in hygiene reduced the need for school nursing after about 1965, and Yogo-Teachers lost their reason for being.

Sakaguchi, then a Yogo-Teacher in an elementary school in Nagano Prefecture, released her practice records to other Yogo-Teachers, mainly in Nagano, proposing educational practice as a new role for Yogo-Teachers. She conducted health education, not only in classroom lessons but also in daily life. She always saw things from the children's point of view. For instance, her records include notes on communication with a child who had had a brain infarction and had difficulty exercising. His remark that he didn't want to eat in the classroom because he ate so slowly' reminded her of the need for support of such children. She decided to develop a curriculum on brain infarction with the help of teachers and parents. The poster presents additional examples. Sakaguchi's practice marks the point at which Yogo-Teachers began to play an educational role.

So far, we have identified three characteristics of her practice. First, she developed original curricula from the needs of actual children instead of simply applying the public curriculum. Second, she was able to identify children's educational needs by recording changes in the children. Third, she expanded her records of communication with children into developing health-education curricula.

In conclusion, the practices created by Sakaguchi can bring about mutually respectful relationships between students and teachers. The most important goal of health education is not to possess expert knowledge, but to produce understanding relationships that nurture other people as well as oneself.

**Day 3****L-22****PO-52***Abstract Number: 20405*

## **Teachers' Learning through Implementing Mathematics Textbook with Lesson Study and Open Approach: Teachers' Knowledge for Teaching in First Grade Mathematics**

Chanika Senawongsa, *Khon Kaen University*

Maitree Inprasitha, *Khon Kaen University*

Narumon Changsri, *Khon Kaen University*

Before entering the 21st Century, most of teachers' learning in Thailand depends upon professional development by disseminating information to teachers by various kinds of short course training (Inprasitha, 2015). In 2002, Center for Research in Mathematics Education Faculty of Education, Khon Kaen University started to conduct Lesson Study and Open Approach in the project for teacher professional development to elementary schools (Inprasitha, 2005). At early stage of this project, Japanese Mathematics Textbook (Thai version) is the main focus of three steps of Lesson Study process. Murata et al. (2004) suggested three specific areas that develop and interact through the Lesson study process to support teacher learning. Furthermore, according to Stein, Remillard, & Smith (2007), this point to how teachers learn through implementing textbook. One among there is improving of teachers' knowledge. Teachers' knowledge about subject matter (content knowledge), pedagogy, and learners may influence teachers' response to textbook including how they use and what they learn from them (Collopy, 2003).

This study was aimed to investigate teachers' knowledge for teaching in first grade mathematics. The participants in this study were 4 teachers who use the textbook in the classroom using Lesson Study and Open Approach. The data were collected from a first grade mathematics lesson that the teachers and Lesson Study team collaboratively interprets problem situation, sequence of teaching, and anticipates students' ideas appeared in the textbook (Inprasitha, 2015). While teaching through 4 steps of open approach, students' ideas have been observed and later discussed. And the data were analysed based on Collopy's framework and Inprasitha's framework.

The results show that the textbook can be effective professional development tool because 1) teachers learned mathematics content 2) they learned how to teach the content and sequence of teaching and 3) they learned students' ideas and how to manage it during designing the lessons; teaching the lessons; and reflecting the lessons through implementing mathematics textbook together.

**Day 3****L-23****PO-53***Abstract Number: 20107*

## **Improving Mathematics Communication Skills through Cooperative Learning In Matrix Algebra**

Siti Inganah, *University of Muhammadiyah Malang*

This research aims to improve students' mathematical-communication skills through cooperative learning in the matrix algebra course. Qualitative approach and exploratory type are employed in Lesson Study activity. The subjects in this research are students who took in matrix algebra course. Lesson Study activity is conducted in some stages, which are Plan, Do, and See in four cycles. The data are collected by doing some observation and recording on field activities. The results show that through cooperative learning method, the students' mathematical communication skills in both written and oral are increasing. The students' ability to read and write symbols correctly are increasing. Students become more active in discussions, interact with their friends in groups, ask each other with some questions, share ideas, and pour the ideas in to some writing.

Keywords: matrix, mathematics communication, cooperative learning

**Day 3****L-24****PO-54**Abstract Number: **20087**

## How to Teach Learning Strategies to the Biology Pre-Service Teacher?

Endang Susantini, *Universitas Negeri Surabaya*Sifak Indana, *Universitas Negeri Surabaya*Isnawati Isnawati, *Universitas Negeri Surabaya*

Learning strategies are cognitive strategies that used by the students to solve the learning problems. The learning strategies are include: simple repetition, complex repetition, elaboration, organization, and metacognition. Teaching Learning Strategies (LS) does not require any specific time. Lecturers or teachers can teach LS while teaching learning material. Pre-servie teachers should have LS, so that they can teach the learning strategies to their students. One way to teach LS is by using metacognitive strategies. The steps of metacognitive strategies applied in this research are the students were asked to write down their' prior knowledge, and then write down the knowledge that has been acquired, after that the students will compared their prior knowledge with the knowledge that already gained, and the final step is the students assess their own concept understanding. There are three purposes of this research: (1) to explore the metacognitive skills of Biology pre-service teachers during LS by using metacognitive strategies, (2) measure the development of learning strategies that use by the pre-service teachers before and after the learning in using metacognitive strategies, (3) describe the response of pre-service teachers after the learning. The research samples were 25 pre-service biology teachers from biology education program of Universitas Negeri Surabaya in the 4th semester. The implementation of metacognitive strategies was conducted in three sessions, those are: namely theoretical study of LS, modeling LS on the topic of ecosystem, and workshop on preparing LS-oriented Biology learning material. The research was design by using one group pre-post test design. The data of metacognitive skills were analyzed by calculating the mean score of the students' skills in determining the levels of confidence, comparing concepts, and determining scores. The data of the increase in students' LS knowledge were analyzed by using n-gain score, while the data of students' responses were analyzed by using descriptive qualitative. The research results shows that (1) the students' metacognitive skills increased from 3.1 to 3.3 out of 4 scale (2) the students' LS knowledge gaining is also increased, from 45.40 to 81.04 (3) the responses of pre-service teachers revealed that they obtained many benefits from the metacognitive strategy learning, such as, it helps to find the important concepts, assess their own concept of understanding, and practice the honesty. The conclusion of this research is that metacognitive strategy can be used to teach learning models or methods as well as to develop students' metacognitive skills. Student who have gained knowledge of learning strategies can choose the best learning strategy in which appropriate to the material that being learned.

**Day 3****L-25****PO-55***Abstract Number: 20401*

## **Lesson Study and Open Approach: A Case Study of 1st Grade Classroom, Khon Kaen University Demonstration School (International Division)**

Alisa Moonsri, *Khonkaen University*

Khemthong Kotmoraka, *Khonkaen University*

Narumon Changsri, *Khonkaen University*

Maitree Inprasitha, *Khonkaen University*

Mathematics classroom that using lesson study and open approach was a collaboration between teachers. This way was the professional development in classroom level. Teachers participated in a well-organized process. Lesson Study provided an opportunity for teachers to clearly understand about teaching and learning in a classroom. They discussed about planning a lesson, implementing and observing a lesson, and reflecting about the classroom. The observation helped teachers to realize about what was a good teaching that supported students' learning (Inprasitha, 2006).

The study examines process the Lesson Study and Open Approach in 1st grade classroom, Khon Kaen University Demonstration School (International Division). The target group included in-service teacher, internship students in Mathematics Education Program, researcher, and research assistant from Center for Research in Mathematics Education, Faculty of Education.

The data were collected by video-tape recording of first grade classroom. The internship students, teachers and researcher collaboratively designed research lesson (plan), observed research lesson (do), and reflected on teaching practice (see) (Inprasitha, 2010).

The research findings found that Phase 1: Collaboratively design research lesson, teachers, observers, and researcher planned the research lesson together every day after observed and reflected about the previous mathematics classroom. In addition, this research lesson followed the steps of open approach including 1) Posing open-ended 2) Students' self-learning 3) Whole class discussion and comparison 4) Summing-up by connecting students emergent mathematical ideas. Phase 2: Collaboratively observing the research lesson, teacher taught the research lesson followed four steps of open approach. Phase 3: Collaboratively reflection on teaching practice. The reflection was on every day after the teacher taught mathematics lesson. The reflection aimed to learn what emerged in the classroom and how to improve for planning the lesson in the next research lesson.

Keyword(s): Lesson Study, open approach

Acknowledgment: This research is granted by the Students' Mathematical Higher Thinking Development Project in Northeastern of Thailand, Center for Research in Mathematics Education (CRME), KhonKaen University, and The Centre of Excellence in Mathematics, the Commission on Higher Education (CEM), Thailand.

**Day 3****L-26****PO-56***Abstract Number: 20212*

## **Developing Teacher-Scholar Partnerships in Early Years Education Lesson Studies: The Historical Legacy of Voluntary Research Groups in Japan**

Sachiko Asai, *Tokyo University*

### 1. Subject of Report

This presentation reports on the historical development of teacher-scholar partnerships in Japanese voluntary research associations. Some early childhood education and care (ECEC) teachers have traditionally engaged in practical research on ECEC with scholars. Among these groups, the voluntary research association Hoiku Mondai Kenkyukai (Homonken: Society for Research on the Problems of ECEC) has been one of the central organizations.

This presentation aims to explain the difference in the concept of teacher-scholar partnership between the first Homonken (1936' 943) and the second Homonken (1953' . Both concepts are significant for this field.

### 2. The First Homonken

Homonken was established in 1936 by scholars of psychology, psychiatry, pedagogy and related disciplines, along with ECEC teachers. They researched the practical problems of ECEC in hopes of discovering solutions. Mantaro Kido, a psychologist and educational reformer who established foundations for educational science, played a leading role. In 1943, however, the first Homonken disbanded during the fighting and aftermath of World War II.

The first Homonken was the first association to organize comprehensive research on children by teachers and scholars. Kido conceptualized the association's teacher-scholar partnership as follows:

- x ECEC problems are discovered by ECEC teachers.
- x ECEC teachers seek solutions to ECEC problems.
- x ECEC teachers collaborate with scholars to build a theoretical foundation for these solutions.

Kido sought to solve the problems of children's development by grasping their social and cultural development through the cooperation of teachers and scholars.

### 3. The Second Homonken

In 1953, ECEC teachers and researchers reestablished Homonken. ECEC teachers wanted a place where they could conduct practical research, and Takashi Inui, a psychologist and disciple of Kido, supported them. Teachers and researchers in the second Homonken have examined ECEC problems, and remain active today. Their ideas have been influential in Japanese ECEC.

Reflecting that participants in the first Homonken conducted "scholar-centered enlightening activities," participants in the second Homonken have tried to share their roles and collaborate on research. Inui conceptualized the teacher-scholar partnership of the association as follows:

x Do not put the present child in the frame of the developmental stage of an infant, as occurs in conventional psychology.

x Based on the results of collaborative research between scholars and practitioners, we can create a future development process for children.

Inui tried to create a process for children's social development through collaborative researches.

#### 4. Conclusion

In the first Homonken, participants established frameworks for ECEC case studies. They understood children's developmental problems in a social and cultural context through a style of teacher-scholar partnership.

By contrast, the second Homonken has made it possible to pioneer the developmental theory of social constructivism.



**Day 3****L-27****PO-57****Abstract Number: 20395**

## **Extending Mathematical Ideas of 5th Grade Students in Classroom Using Lesson Study and Open Approach**

Kanyarat Phiasuwan, *Khon Kaen University*

Auijit Pattanajak, *Khon Kaen University*

The purpose of this research is to analyze the extending student's mathematical ideas in the classroom which utilizes the Lesson Study and the Open Approach (Inprasitha, 2011). This study was the qualitative research method that emphasized on analytic description and protocol analysis. The target group was the sixth grade students in the first semester of the academic year 2016 at the Chum Chon Kuddon Wittayakom School where is located in Kalasin province. This school has been subjected to the project for professional development of mathematics teachers through Lesson Study and Open Approach which is implemented by the center for research in mathematics education, Faculty of Education, Khon Kaen University. The instruments used in data analysis were divided into 3 parts: protocols (by using a tape recorder, video camera and field note), students' work from activities and interviews.

As the results of this research, showed that lesson study teams worked to create a lesson plan together. In each lesson plan, lesson study teams analyze the ideas of each subject, to find the way to create a problematic situation that would be used in an open approach. In the classroom using lesson study and open approach students solved the mathematical problems by themselves and that make various mathematical ideas. When students exchanged their ideas with each other they communicate ideas too. Consequently, the ideas was extended. That is students found relation and connection between each ideas. Students found rule formula, definitions, how to solve problems to be generalization and can be extended to connect to each topic which is the higher order thinking.

**Keywords:** Lesson Study, Open Approach, Extending Mathematical Ideas

**Day 3****L-28****PO-58**Abstract Number: **20294**

## **MPPLC and Reflection to Promote Reading and Writing Ability of Prathomsuksa 1 Students and Disability Students in Reading and Writing**

Pakapun Weerasing, *Pattaya City 7 School (Ban Nong Phang Khae)*

The purpose of this research was 1) to study the reading and writing ability of Grade 1 students at Pattaya City School 7 (Ban Nong Phang Khae) after using Management Processing with Professional Learning Community and Reflection, and 2) to study the reading and writing ability of disability students from Grade 2 to Grade 9 after using Management Process with Professional Learning Community and Reflection. The target group was 174 Students in Grade and 46 disability students in reading and writing from Grade 2 to Grade 9. Professional Learning Community was composed of the school director, deputy school director of academic affairs, head of academic affairs, head of Thai language department, Thai language teachers, heads of class level, Class room teachers, volunteer teachers and parents. Management Process with Professional Learning Community and Reflection was comprised of 4 stages 1) analyzing problems and reflection stage 2) doing and reflection stage 3) checking and reflection stage and 4) revising and reflection stage. The experimental instruments used were 1) manuals of the Management Process with Professional Learning Community and Reflection, and 2) teacher manuals based on the four-step skills pattern. The research instruments were reading and writing ability assessment forms and reflecting forms. The result data were analyzed for mean, percentage and qualitative data analysis.

The findings of the study are as follows:

1. The assessment result showed that Grade 1 students could improve their reading and writing ability to very good level after using Management Process with Professional Learning Community and Reflection. When discriminated from the indicators, the result showed that the students can read phoneme segmentation, tone, words, phrases and messages, and they could perform handwriting at very good level whereas the others ability indicators results were at good level.

2. The assessment result show that disability Grade 2 to Grade 9 students could improve their reading and writing ability to very good level after using Management Process with Professional Learning Community and Reflection. When discriminated from the indicators, the result showed that the students could read phoneme segmentation, tone, words and phrases, and they could take dictation at very good level whereas the others ability indicators results were at good level.

The Reflection result of Management Process with Professional Learning Community and Reflection to teaching based on the four-step skills pattern showed that the students felt happy to read and write. Moreover, high reading ability students could peer-tutor their friends. The volunteer teacher was satisfied with the results and applying the reflection results to the next instruction. Parents have satisfy for the result ,and cooperated with the school to teach their children to read and write at home.

**Day 3****L-29****PO-59****Abstract Number: 20436**

## **Lesson Study on Using TAD as a Pre-Writing Tool to Develop Ideas**

Soo Yin Chia, *North Vista Primary School*

Dashni Ravindran, *Si Ling Primary School*

To address a common complaint amongst primary school students in Singapore that they lacked details in their writing, Steve Peha's (2014) ideas development strategy, Transition-Action-Details (TAD) was taught to two classes of students of the same level in two different schools. The results and observation in this study

showed encouraging results not only in the students' ability to develop ideas before writing but also in a more positive attitude towards writing.

This Lesson Study project was undertaken by two teachers from two different primary schools as a collaborative effort to help their students generate and develop details for writing at the pre-writing stage. The teachers, together with two knowledgeable others from the English Language Institute of Singapore (ELIS), collaboratively planned lessons to introduce and teach TAD to students in one school. After the complete lesson enactment in the first school, the team reflected on the impact of the lessons and refined the process.

The second enactment was carried out by the teacher in the second school.

Using a pre-intervention composition writing as a baseline standard, these students were taught to use TAD to develop ideas for writing. During lesson enactment, scaffolding was provided in the form of teacher modelling and explicit instruction. Several cycles of this took place to allow the students to develop a comfort level to use TAD before writing their compositions. Students reported feeling more empowered to write better and found that writing could be 'fun'.

Findings from students' and teachers' reflections, together with TAD charts produced by the students during lesson enactment and the students' writing at the end of the inquiry process that showed an increase in relevant and well-developed ideas in the students' writing will be presented. The study has implications on the classroom practice of teaching writing and developing students' competency in writing and enjoyment of writing.

**Day 3****L-30****PO-60***Abstract Number: 20338*

## **Improving Prospective Teachers' Competence to Plan and Teach thoughtfully and Collaboratively in Comparative Chinese and American Cultural Contexts**

Yali Zhao, *Georgia State University*

Dehua Liu, *Hunan Normal University*

Lesson Study (LS) is an effective way for teacher professional development in Japanese schools, especially in the area of math and science education, and has gained much attention in Asia and North America since late 1990s. In China, lesson study, more commonly in the name of public teaching demonstration or action education, is widely encouraged and implemented in Chinese schools to help young and novice teachers develop instructional skills and competence thanks to China's new curriculum reform which emphasizes on improving teacher quality, students' academic performance, creativity and problem-solving skills, as well as similar cultural and educational system as in Japan: centralized curriculum, collectivism, and open-mindedness to critique. This is in stark contrast with the American schools where localized school curriculum, teacher isolation, and individual effectiveness seem to dominate. A considerable amount of research has been conducted to examine the effectiveness of lesson studies, however, most of the research focused on math or science in-service teachers. More research on prospective teachers and in social education arena is needed to help us better understand the complexity and the benefits of using lesson study to help prospective teachers to develop collaborative and reflective skills, build up meaningful content knowledge and more effective instructional strategies.

This comparative case study aims to examine how lesson study could be implemented similarly and differently with prospective teachers in Chinese and American cultural and educational contexts in the process of identifying lesson topics or issues, learning objectives, accommodation of student needs, collecting and preparing teaching materials, designing activities, teaching, debriefing, and refining the lesson.